

Chemistry 121  
Spring 2004  
Test 1  
FORM A

Name: \_\_\_\_\_

Instructions: You have 75 minutes to complete this 100-point exam. You may use a simple scientific calculator. No programmable calculators allowed.

$$^{\circ}F = \left( \frac{9^{\circ}F}{5^{\circ}C} \right) (^{\circ}C) + 32^{\circ}F$$

$$^{\circ}C = \left( \frac{5^{\circ}C}{9^{\circ}F} \right) (^{\circ}F - 32^{\circ}F)$$

$$1 \text{ in} = 2.54 \text{ cm}$$

$$1000\text{g} = 1\text{kg}$$

$$1000 \text{ mg} = 1 \text{ g}$$

**I. MULTIPLE CHOICE:** (30 pts, 3 points each) Carefully and clearly circle the best answer.

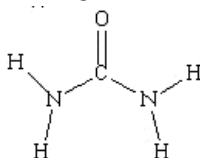
- The correct elemental symbol for silicon is:
  - S
  - Se
  - Si
  - Sc
- Which element has properties similar to arsenic, As?
  - Sb
  - Se
  - Ge
  - S
- The melting point of sodium is  $98^{\circ}\text{C}$ , what is this in Kelvin?
  - 175 K
  - 371 K
  - 175 K
  - 371 K
- Which of the following elements is an alkaline earth metal?
  - Na
  - F
  - Cr
  - Sr
- A calcium atom has 20 neutrons. Its mass number is:
  - 40.08
  - 20
  - 40
  - 60

6. An atom of vanadium (V) loses 2 electrons. It is now called a(n)
- Anion
  - Element
  - Isotope
  - Cation

7. What ion is likely to form from selenium (Se)?
- Se<sup>+</sup>
  - Se<sup>2+</sup>
  - Se<sup>-2</sup>
  - Se<sup>-</sup>

8. What is the chemical formula of the following molecule?

- CN<sub>2</sub>OH<sub>4</sub>
- H<sub>2</sub>NCONH<sub>2</sub>
- ON<sub>2</sub>CH<sub>4</sub>
- CH<sub>4</sub>N<sub>2</sub>O



9. If sodium acetate, NaCH<sub>3</sub>CO<sub>2</sub>, breaks up, what ions will result?

- Na<sup>+</sup>, CH<sub>3</sub>, CO<sub>2</sub>
- Na, CH<sub>3</sub>CO<sub>2</sub>
- Na<sup>+</sup>, CH<sub>3</sub>CO<sub>2</sub><sup>-</sup>
- Na<sup>2+</sup>, CH<sub>3</sub>CO<sub>2</sub><sup>2-</sup>

10. The smallest particle of an element that retains the chemical properties of the element is a(n):
- atom
  - ion
  - solid
  - molecule

**II. Short Answer and Calculations** (80 pts): Clearly indicate your answer in the space provided. Partial credit will be given for correct work. If I cannot read the work, it will not be graded.

1. (10 pts) Name the following compounds:

- SCl<sub>2</sub> \_\_\_\_\_
- PF<sub>3</sub> \_\_\_\_\_
- CaSO<sub>4</sub> \_\_\_\_\_
- Fe<sub>2</sub>O<sub>3</sub> \_\_\_\_\_
- NH<sub>4</sub>NO<sub>3</sub> \_\_\_\_\_

2. (10 pts) Give the correct formula for the following compounds:

- Sulfur hexafluoride \_\_\_\_\_
- Sodium carbonate \_\_\_\_\_
- Magnesium hydroxide \_\_\_\_\_
- Chromium (II) chloride \_\_\_\_\_
- Copper (II) hydroxide hexahydrate \_\_\_\_\_

3. (10 pts) What is the volume of 3.00 g alcohol that has a density of 0.785 g/mL?
4. (10 pts) What is the molar mass of ammonium sulfide,  $(\text{NH}_4)_2\text{S}$ ?
5. (10 pts) How many molecules are there in 2.35 g of ammonium sulfide? (HINT: use molar mass from previous problem)

6. (15 pts) Element Q on Planet Qurtok has 2 stable isotopes,  $^{49}\text{Q}$  (49.06885 g/mol) and  $^{52}\text{Q}$  (51.96590 g/mol). What is the percent abundance of each isotope if the molar mass of Q is 49.9576 g/mol?

7. (15 pts) Vitamin C (also called Ascorbic Acid) can be found in citrus fruit, berries, broccoli, tomatoes, etc. It is composed of carbon (40.91%), hydrogen (4.55%) and oxygen (54.55%) and has a molar mass of 176 g/mol. What are Vitamin C's empirical and molecular formulas?